



Arsenic Rule Background

Jeffrey B. Kempic
OGWDW

Workshop of Arsenic-Bearing Solid Residuals
February 28, 2005



Arsenic Rulemaking

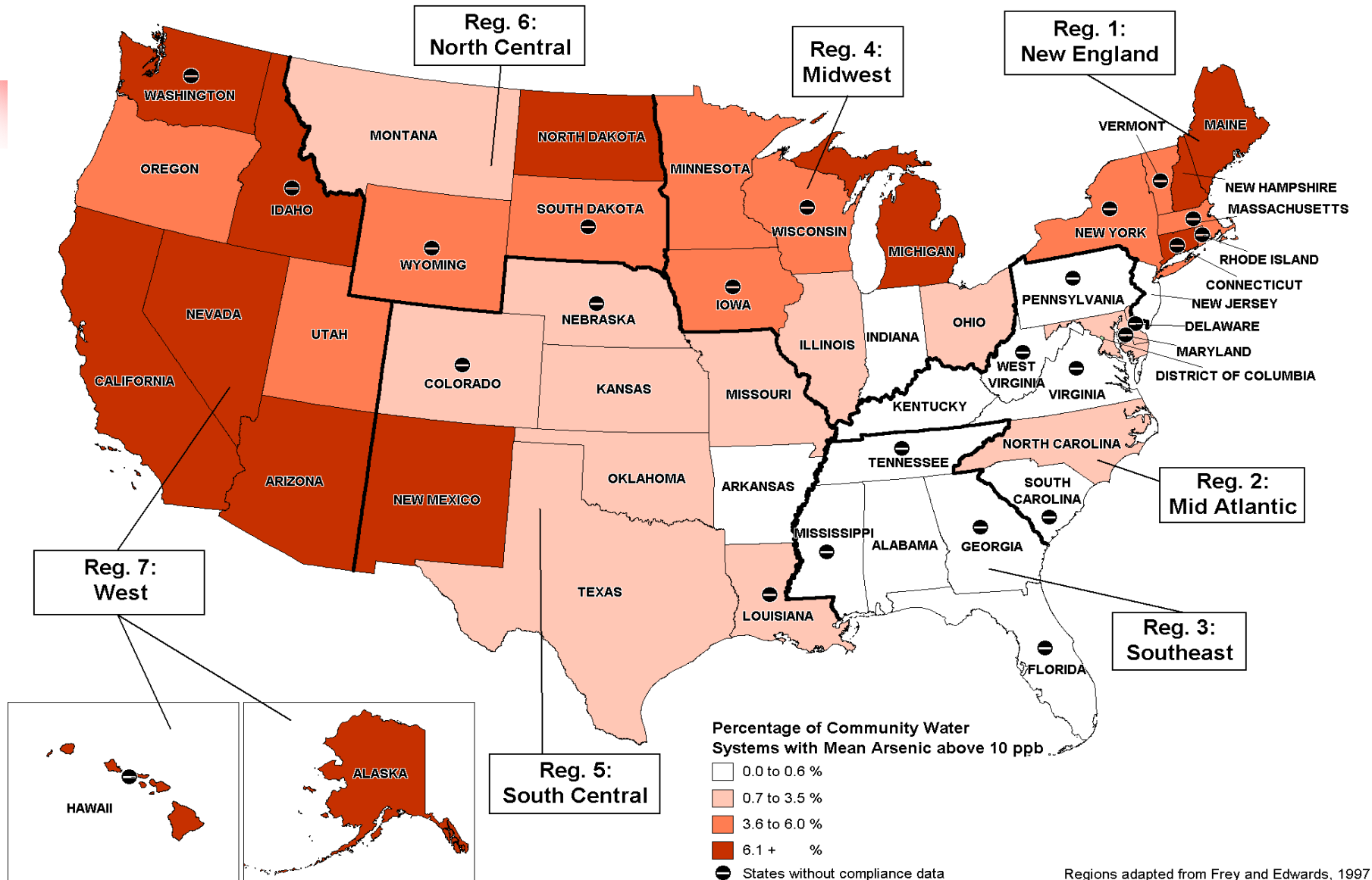
- Proposed Arsenic Rule

- June 22, 2000
- 5 ppb standard for arsenic
- EPA requested comment on 20 ppb, 10 ppb, and 3 ppb

- Final Arsenic Rule

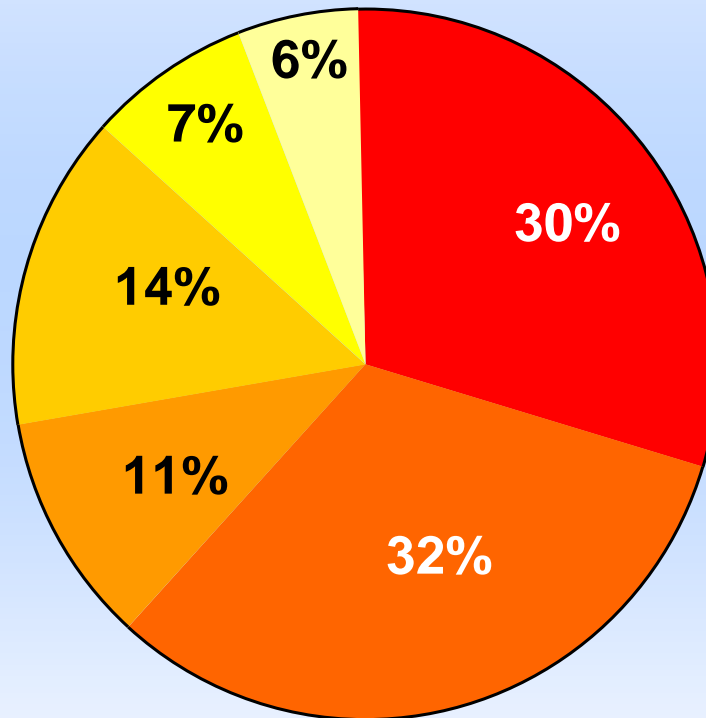
- January 22, 2001
- 10 ppb standard for arsenic

Percentage of Community Water Systems with Mean Arsenic above 10 ppb

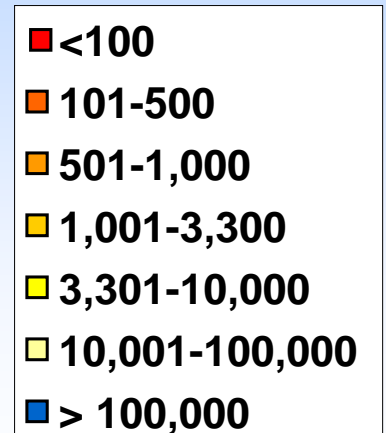


SCOPE

Most Of The ~3000 CWSs Affected by the Arsenic Rule Are Very Small



**Percentage of systems
serving different size
populations**

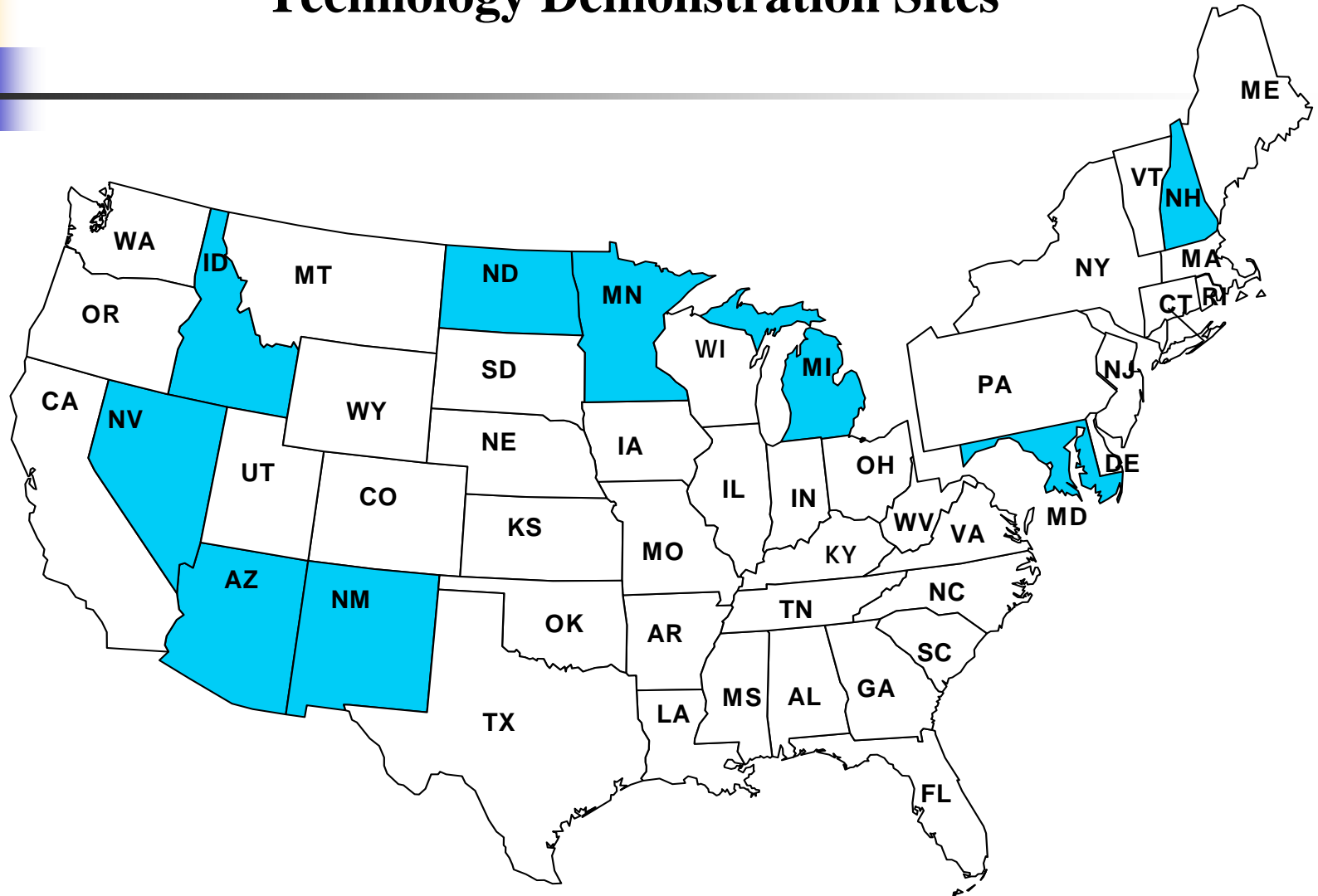




Arsenic Rule BAT and SSCT

Technology	BAT	SSCT
Mod. lime softening	yes	1,2,3
Mod. coagulation/filtration	yes	1,2,3
Anion exchange	yes	1,2,3
Coag.-assisted microfiltration	no	2,3
Oxidation-filtration (greensand)	yes	1,2,3
Activated alumina	yes	1,2,3
Reverse osmosis	yes	2,3
Electrodialysis reversal	yes	2,3
POU reverse osmosis	no	1,2,3
POU activated alumina	no	1,2,3

Round 1 - Arsenic Treatment Technology Demonstration Sites





Round 1 Arsenic Treatment Technology Demonstration Sites

<u>Site</u>	<u>Technology to be Demonstrated</u>
Rimrock, AZ	AdEdge Iron Media
Valley Vista, AZ	Kinetico Activated Alumina
City of Fruitland, Fruitland, ID	Kinetico Ion Exchange
Queen Anne's Co, Stevensville, MD	Severn Trent Iron Media
Brown City, Brown City, MI	Severn Trent Iron Media
Town of Climax, Climax, MI	Kinetico Oxid/CoPrecip/Filtration
Lidgerwood, ND	Kinetico Modified Treatment
Bow, NH	ADI Iron Adsorption /Regeneration
Rollinsford, NH	AdEdge Iron Media
Anthony, NM	Severn Trent Iron Media
Nambe Pueblo, NM	AdEdge Iron Media
South Truckee Meadows, Reno, NV	US Filter Iron Media

Arsenic Residuals: Disposal Issues and Methods Updated Excerpt



Jeffrey B. Kempic
OGWDW, USEPA

Water Quality Technology Conference
November 8, 2000 (February 28, 2005)



Definitions Relating to Residuals

- Toxicity Characteristic (TC) - regulatory level for designating a waste as hazardous based on toxicity (drinking water health risk)
- Toxicity Characteristic Leaching Procedure (TCLP) - method by which waste is evaluated to determine if it exceeds the TC
- Dilution/Attenuation Factor (DAF) - reduction in concentration estimated to occur between the bottom of a landfill and a down-gradient drinking water well



Background on Drinking Water Residuals

- Arsenic treatment technologies produce three different types of wastes: brines, sludges and spent media.
- TC can apply to all three types of waste
- Current TC for arsenic is 5 mg/L
- TC may/may not change with a revised MCL
- Arsenic regulation assumes generated wastes are non-hazardous



Ground Water Treatment Technologies & Residuals

- Anion Exchange (AX) - regeneration brine
- Activated Alumina (AA) - regeneration brine & spent media or just spent media
- ***Iron-based media –spent media***
- Point-of-Use/Point-of-Entry (POU/POE)
Activated Alumina ***or Iron-based media-***
spent media
- POU Reverse osmosis - concentrate brine



MCLs and TC levels for Metals

- TC levels for metals were based on a DAF of 100 times a health endpoint
- The Interim Primary Drinking Water MCLs were used to calculate the TC levels
- Drinking Water MCLs have been revised since 1990 whereas TC levels have not changed
- No TC levels for metals regulated in drinking water after 1990



Current TC/MCL Ratio for Metals

Metals with
TC/MCL < 100

Barium,
Chromium,
Selenium

Metals with
TC/MCL = 100

Mercury

Metals with
TC/MCL > 100

Arsenic,
Cadmium,
Lead



Revision of TC Levels

- Revision of TC would require separate rulemaking - NOT linked with MCLs
- No possibility that uniform DAF of 100 X MCL would be used to revise metal TC levels - DAF will be individually modeled
- Ground water fate and transport modeling has changed dramatically since 1990
- Critical factors - time horizon, distance between landfill & well, waste management approach



TCLP Test and Residuals

- If waste $< 0.5\%$ dryweight solids, then liquid is TCLP extract and concentrations in it are compared against TC regulatory level
- If waste $\geq 0.5\%$ solids, solids extracted using fluid 20 times the weight of solids
- Extraction fluid - acetic acid solution (buffered at pH 5)
- Solution rotated for 18 hours, then filtered and analyzed for arsenic



Brine Streams and TC Regulatory Levels

- Brine streams will be directly evaluated against the TC regulatory level since they will be less than 0.5% solids
- Brine streams could be deemed hazardous waste when $As \geq 5 \text{ mg/L}$
- Does not impact disposal to POTW
- May restrict disposal to evaporation pond to only those streams $< 5 \text{ mg/L}$